A STUDY FOR THE APPLICATION OF REMOTE SENSING DATA TO LAND USE PLANNING ON THE MISSISSIPPI GULF COAST

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16. Abstract

Reports the current status of Contract NAS5-21817. To date a minimal effort is being maintained due to the scheduling of the data analysis. Several project meetings have been held including a trip to the NASA-MTF-ERL facility for a survey of the data analysis and typical computer produced products.

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PREFACE

The objective of this work is to develop a comparison of ERTS-1 data with data from existing land use studies of the four county area of the Mississippi Gulf Coast. ERTS-1 data will be analyzed by computer programs at the NASA-MTF-ERL facility and land use maps will be produced by the MTF facility which delineate categories of interest.

These computer produced products will be analyzed by MSU personnel to determine accuracy and suitability of the data for land use planning compared to the present means of data collection for such studies.

Due to the schedule of the NASA-MTF-ERL personnel it will be early April before the data products will be forthcoming. It will be at this point that the main thrust of the project effort will begin.

Several meetings of project personnel have been called including a trip to the NASA-MTF-ERL facility to familarize the personnel with the facility and to see the type of data outputs that will be forthcoming.

INTRODUCTION

This report covers the period from September 1972 through January 1973 and describes the progress of the project during this period.

The project scheduling has been determined by the data analysis schedule of the NASA-MTF-ERL facility. The analysis of the ERTS-1

data is to be performed via computer analysis programs of the NASA-MTF-ERL and these items will be forthcoming in late March 1973.

As a result the project has had a minimal expenditure of funds and a minimal work effort to date. The majority of the funds will be expended and work effort will be performed during the early summer months of May-July 1973.

During this reporting period, several meetings of all project personnel have been called so that the project objectives could be reviewed and a plan of the work effort made.

Plans are made for several meetings between now and May so that the project personnel will be ready to initiate full effort when the computer data products are issued. A trip was made by all contract personnel to the NASA-MTF-ERL facility to become familar with the data processing methods and the resulting computer outputs.

PROJECT ORGANIZATION AND STATUS

The personnel involved in the project, their are a of responsibility and their percent time of effort for the summer are listed below.

Mr. R. W. Boyd, Responsible for Data Logging and Rough Analysis of the ERTS-1 data, Fulltime 12 weeks
Mrs. Ellen Bryant, Responsible for Demographic Analysis of the MTF data products, 60% 3 months.
Mr. Robert Chapin, Responsible for Land Use Planning Analysis of the MTF data products, 60% 3 months.
Dr. S. R. Jones, Responsible for Economic Analysis of the MTF data product, 40% 3 months.
Dr. F. M. Ingels, Responsible for Coordination of effort and Principle Investigator, 60% 3 months.

The project scheduling is as follows:

Phase I - September 1972-January 1973

Familarization of the project personnel with the ERTS-1 system, the NASA-MTF-ERL facility and the type of computer data to be issued from NASA-MTF-ERL.

Organization of activities for data logging and visual analysis of the raw ERTS-1 data received so as to provide a basis for determining the statistical reliability of obtaining ERTS-1 data over a yearly period. Organization of the project and scheduling the activities of the project personnel.

Phase II - February 1973-April 1973

Determine the criteria for judgement of the applicability of the ERTS-1 data to the problems of Land Use Planning on the Mississippi Gulf Coast.

Make a preliminary study using photomaps of the Gulf Coastal four county area which have been compiled by NASA-MTF-ERL in conjunction with the Gulf Coast Regional Planning Commission. These photomaps are similar in nature to the computer data output expected and in fact are better products than can be hoped to be obtained from the ERTS-1 data insofar as resolution and scale is concerned.

Phase III - May 1973-September 1973

Initiation of the major effort of the contract personnel on the application of the ERTS-1 data to Land Use Planning of the Gulf Coastal Region. Trips to various agencies are planned to discuss with them the data outputs available and possible applications of such data. An analysis will be made of how such data might be put to use and the requirements various uses would place on the data such as frequency of updating cost, accuracy and time lag between acquisition by the ERTS-1 sattelite and the distribution of the computer analysis to the user.

Final report draft will be made during the last month of this phase.

To date the Phase I objectives have been fulfilled and initiation of Phase II has been made. A preliminary study will be made in February and March using the Land Use Maps produced by NASA-MTF-ERL from their High Altitude Aircraft Photography.

A project review was held for Mr. R. Pyland of NASA-MTF-ERL on January 25, 1973. The status of the project financially and technically was presented.

DISCUSSION OF DATA RECEIVED AND OF THE ANALYSIS LOGS

According to the orbits of ERTS-1, data from the Gulf Coast region of interest should be obtained twice (once each on two adjacent orbits) every 18 day cycle. Table 1 lists the orbit members, dates, and times of interest and also shows those orbits for which we have received copies of the data taken.

The data we have received has been visually analyzed to determine total area covered, percent of Gulf Coast study site covered, cloud cover, system abnormalities, and apparent quality. The results of this analysis is recorded on a data analysis sheet (a copy of this sheet is contained with the report). The results of this visual study will be used to make statistical statements about the availability of ERTS-1 data, how often it is corrupted or made useless by clouds or system problems, and other related ideas which will appear in the project final report.

CYCLE	DATE	ORBIT	DATE - TIME	CENTER POINT N. LAT	CENTER POINT W. LONG	CLOUD COVER	DATA RCV'D.
Cycle I	Aug 6	194	1014 - 15555	30.575	87.995	20%	
	Aug 7	208	1015 - 16013	30.581	89.441	0%	
Cycle II	Aug 24	445	1032 - 15555	30.640	87.960	30%	Yes ✓
	Aug 25	459	1033 - 16014	30.228	89.595	50%	
Cycle III	Sept 11	696	1050 - 15560	30.290	88.106	50%	
	Sept 12	710	1051 - 16014	30.296	89.545	20%	Yes ✓
Cycle IV	Sept 29	947	1068 - 15560	30.323	88.106	50%	
	Sept 30	961	1069 - 16014	30.324	89.467	90%	
Cycle V	Oct 17	1198	1086 - 15562	30.294	88.097	20%	
	Oct 18	1212	1087 - 16020	30.297	89.530	80%	
Cycle VI	Nov 4	1449	1104 - 15561	31.560	87.791	60%	
	Nov 5	1463	1105 - 16022	30.143	89.602	90%	
Cycle VII	Nov 22	1700	1122 - 15565	30.271	88.178	80%	
	Nov 23	1714	1123 - 16023	30.222	89.596	90%	
Cycle VIII	Dec 10	1951	Not Listed				
	Dec 11	1965	1141 - 16023	30.107	89.642	100%	
Cycle IX	Dec 28		Catalog not received				
	Dec 29		Catalog not received				

TABLE 1 - DATA TAKEN OVER GULF COAST TEST SITE DURING 1972

GULF COAST DATA ANALYSIS SHEET

PICTURE DATE	PICTURE TIME	% TEST SITE PICTURE	% TEST SITE PASS	CLOUD COVER PICTURE	CLOUD COVER SITE	COMMENTS	# OF SETS	70 MM
1032	15555	40 %	40 %	30%	10%	Good over Gulfport - Biloxi area One set went to Frank Miller at Forestry dept.	2	✓
24 Aug 72								
1050	15553	0 %	0 %	5 %	not covered	About half the scan lines are missing on camera 6	2	✓
11 Sept 72								
1051	16012	0 %	90 %	1 %	50%	About 1/4 the camera 6 scan lines are missing. Clouds make this pass of very little use to us.	2	✓
	16014	90 %		20 %			2	✓
12 Sept 72								
1052	16070	0 %	0 %	0 %	not covered	About 1/3 of camera 6 scan lines are missing.	2	✓
13 Sept 72								
1070	16070	0 %	0 %	0 %	not covered		2	✓
	16073	0 %		0 %			2	✓
1 Oct 72								
1106	16074	0 %	0 %	2 %	not covered		2	✓
6 Nov 72								

All data received at MSU for both this project (SR-095) and the Mississippi Delta study (SR-097) is inventoried and logged upon receipt. A copy of these log sheets has been included with this report.

To this date so little data has been received for the Gulf Coastal area (due mainly to excessive cloud cover) that no statements about its usefulness can be made; however, we feel the general quality of ERTS-1 data is as good or better than we had expected. Much of the data we have received does not cover any part of the coastal area of interest.

The only real observation about the data is that pictures taken at the same time on orbits separated by 18 day increments do not cover the same area, that is there appears to be a slip in the orbit. The latter pictures have centers north and east (higher in the orbit) than the earlier pictures do. For example, the center of 1052-16070 taken 13 September 1972 is lower in the orbit than the center of 1070-16070 taken 1 October 1972. This is shown on the coverage map included (Fig. 1).

PROGRAM FOR NEXT REPORTING INTERVAL

A land use map atlas of the Hancock County area of the Mississippi Gulf Coast has been obtained from the NASA-MTF-ERL facility. This map atlas is a result of an experiment by the Earth Resources Laboratory at the Mississippi Test Facility to economically prepare land use maps from high altitude small scale photography.

ERTS-1 DATA INVENTORY SHEET

DATE RECEIVED	DATA FROM DAY	DATA FROM TIME	RBV 1	RBV 2	RBV 3	MSS 4	MSS 5	MSS 6	MSS 7	FORMAT T	FORMAT M	CATALOG U.S.	CATALOG NON	CATALOG LAST DAY	COMMENTS	P.I. - UN 023	P.I. - UN 649
28 Sept 72	1Ø32	15555				1	1	1	1		✓						✓
28 Sept 72	1Ø32	15555				2	2	2	2	✓							✓
24 Oct 72	1Ø51	16Ø12				1	1	1	1		✓						✓
24 Oct 72	1Ø51	16Ø12				2	2	2	2	✓							✓
24 Oct 72	1Ø51	16Ø14				1	1	1	1		✓						✓
24 Oct 72	1Ø51	16Ø14				2	2	2	2	✓							✓
24 Oct 72	1Ø5Ø	15553				1	1	1	1		✓						✓
24 Oct 72	1Ø5Ø	15553				1	2	2	2	✓					Short one print from camera 4		✓
24 Oct 72	1Ø52	16Ø7Ø				1	1	1	1		✓						✓
24 Oct 72	1Ø52	16Ø7Ø				2	2	2	2	✓							✓
25 Oct 72	1Ø52	16Ø61				1	1	1	1		✓					✓	
25 Oct 72	1Ø52	16Ø61				1	1	1	1	✓					Short one print on each camera	✓	
25 Oct 72	1Ø52	16Ø64				1	1	1	1		✓					✓	
25 Oct 72	1Ø52	16Ø64				1	1	1	1	✓					Short one print on each camera	✓	
25 Oct 72	1Ø52	16Ø7Ø				1	1	1	1		✓					✓	
25 Oct 72	1Ø52	16Ø7Ø				1	1	1	1	✓					Short one print on each camera	✓	

DATE RECEIVED	DATA FROM		RBV			MSS				FORMAT		CATALOG			COMMENTS	P.I. - UN	
	DAY	TIME	1	2	3	4	5	6	7	T	M	U.S.	NON	LAST DAY		023	649
1 Nov 72	1071	16120				1	1	1	1		✓				partial - no pos. transparency	✓	
1 Nov 72	1071	16122				1	1	1	1		✓				partial - no pos. transpanency	✓	
1 Nov 72	1071	16125				1	1	1	1		✓				partial - no pos. transparency	✓	
6 Nov 72	1070	16070				1	1	1	1		✓						✓
6 Nov 72	1070	16070				2	2	2	2	✓							✓
6 Nov 72	1070	16073				1	1	1	1		✓						✓
6 Nov 72	1070	16073				2	2	2	2	✓							✓
8 Nov 72	1070	16061				2	2	2	2	✓					partial - no 70mm	✓	
8 Nov 72	1070	16064				2	2	2	2	✓					partial - no 70 mm	✓	
8 Nov 72	1070	16070				2	2	2	2	✓					partial - no 70mm	✓	
14 Nov 72	1035	16121				1	1	1	1		✓					✓	
14 Nov 72	1035	16121				2	2	2	2	✓						✓	
14 Nov 72	1035	16124				1	1	1	1		✓					✓	
14 Nov 72	1035	16124				2	2	2	2	✓						✓	
16 Nov 72													✓	23 Sept			✓
17 Nov 72												✓		23 Sept			✓

DATE RECEIVED	DATA FROM		RBV			MSS				FORMAT		CATALOG			COMMENTS	P.I. - UN	
	DAY	TIME	1	2	3	4	5	6	7	T	M	U.S.	NON	LAST DAY		023	649
12 Dec 72	11Ø6	16Ø74				1	1	1	1		✓						✓
12 Dec 72	11Ø6	16Ø74				2	2	2	2	✓							✓
19 Dec 72	1Ø71	1612Ø				2	2	2	2	✓					completes a partial shipment of 1 Nov 72	✓	
19 Dec 72	1Ø71	16122				2	2	2	2	✓					completes a partial shipment on 1 Nov 72	✓	
19 Dec 72	1Ø71	16125				2	2	2	2	✓					completes a partial shipment on 1 Nov 72	✓	
15 Jan 73	1Ø7Ø	16Ø61				1	1	1	1		✓				completes a partial shipment on 8 Nov 72	✓	
15 Jan 73	1Ø7Ø	16Ø64				1	1	1	1		✓				completes a partial shipment on 8 Nov 72	✓	
15 Jan 73	1Ø7Ø	16Ø7Ø				1	1	1	1		✓				completes a partial shipment on 8 Nov 72	✓	
16 Jan 73													✓	30 Nov 72			✓
26 Jan 73	1Ø7Ø	16Ø61				1	1	1	1		✓				duplicates 15 Jan 73 shipment	✓	
26 Jan 73	1Ø7Ø	16Ø64				1	1	1	1		✓				duplicates 16 Jan 73 shipment	✓	
26 Jan 73	1Ø7Ø	16Ø7Ø				1	1	1	1		✓				duplicates 15 Jan 73 shipment	✓	
26 Jan 73												✓		31 Dec 72			✓

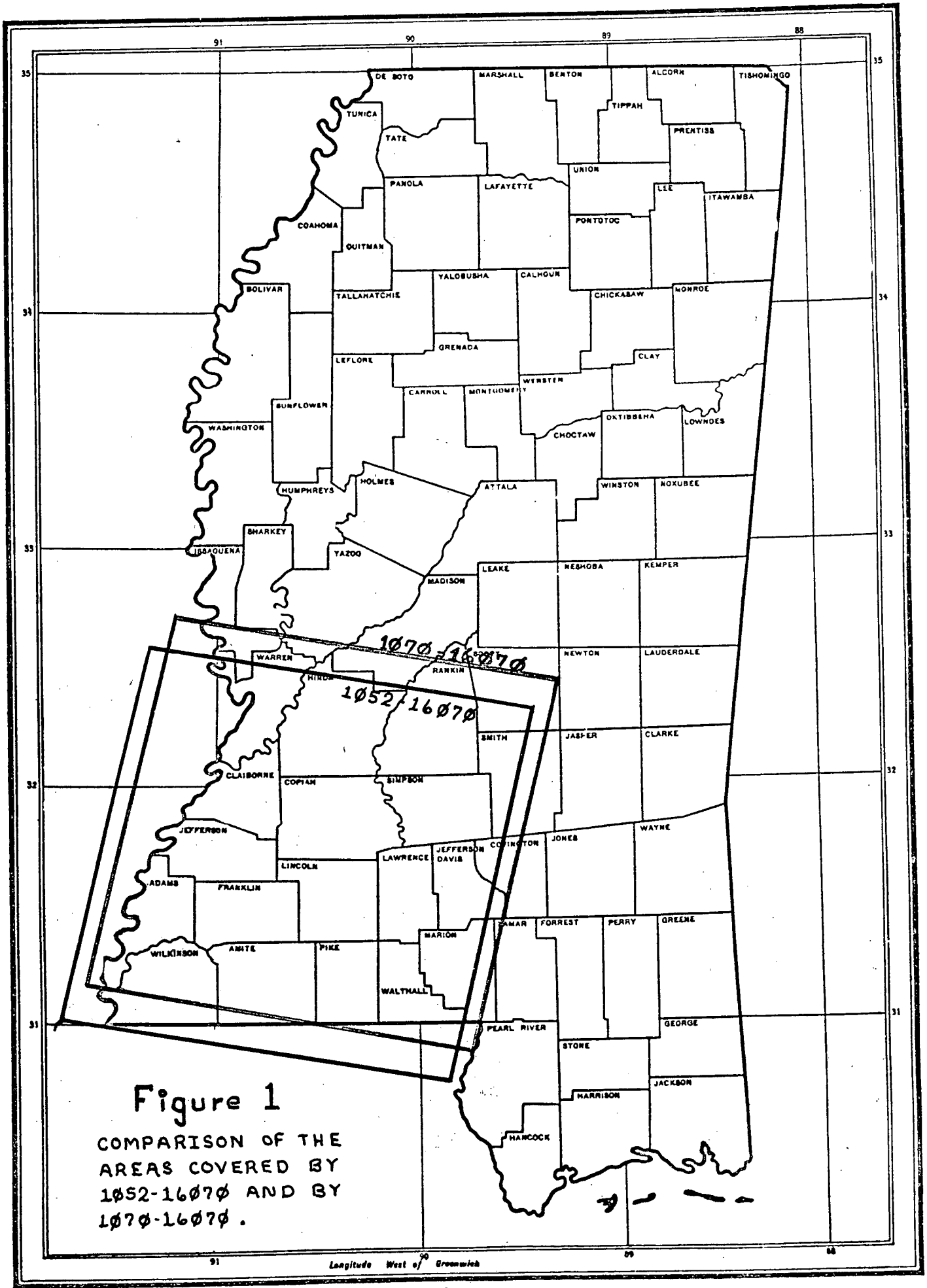

Figure 1

COMPARISON OF THE AREAS COVERED BY 1052-1607Ø AND BY 1070-1607Ø.

While the maps contained in the atlas are similar to those we hope to obtain from the ERTS-1 analysis they are of course more accurate and in general a better quality map than what will likely result from the ERTS-1 data. However, it seems very appropriate for us to conduct an initial study of the application of this type of data to Land Use Planning in general for the Gulf Coast.

By using these maps for the initial study it is hoped that an insight into potential problems may be made before the ERTS-1 maps are obtained. This will give the project a better chance to be fully prepared to make a thorough appraisal of the ERTS-1 data and will in fact provide us with a basis for judging the ERTS-1 data in the computer map form.

A trip to the Gulf Coast to visit with Mr. Jack Different, Director of the Gulf Coastal Planning Commission will be made to insure a coordinated effort with his group.

CONCLUSIONS

At this point it is too early to speculate on the results of an analysis of ERTS-1 data to Land Use Planning for the Mississippi Gulf Coast. However, it appears that the ERTS-1 data products will have some value for the overall synoptic view provided.

As opposed to an agriculture type of study where time lag between data taken and data receipt by the user is critical it is true that for Land Use Planning studies this time lag is not as critical.

The project personnel look forward with anticipation to the receipt of the computer maps of the area under study.

RECOMMENDATIONS

We have no recommendations to offer at this time.